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INVESTIGATIONS OF ANOMALIES
GORDON AREA
1958-59

59-282

MICROFILMED

Anomalies - Gordon Area. 1958/59
L.G.S. 8/6/59.

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LYELL - E.Z. - EXPLORATIONS

95
Q64, Q71, Q72,
Q78, Q79

2nd June, 1959

To: Mr. G.F. Hudspeth.

INVESTIGATION OF ANOMALIES - GORDON AREA 1958/1959

The enclosed reports give a summary and an assessment of the work carried out on the airborne geophysical and geological anomalies during December, 1958 to April, 1959.

With the exception of a small investigation at 9/4, of the fifteen airborne anomalies investigated, one (10/8) has features worthy of future interest. This has already been outlined in report G86 on this anomaly and the work is scheduled to take place in November/December this year.

Two out of the five geological anomalies do not contain mineralisation of interest, the remaining three are still to be checked. Anomaly 6/3 (Pelias Cove) can be investigated before 1st November, leaving only 20/9 and Moore's Valley to be included in the forthcoming summer programme.

B. Scott

Chief Geologist, L.E.E.

INVESTIGATION OF ANOMALIES - GORDON AREA SUMMER 1958/1959

I. The Airborne Programme

1. Assessment of Anomalies

A. The first assessment of anomalies was by H.S. Hancock in his first report (page 32) to Lyell-E.Z. Explorations of January, 1959. This list was available at the middle of November 1958 and was the basis for the beginning of the field programme last December (list in Table I attached). It included 28 anomalies.

B. On the basis of field work during December and a further examination of the airborne traces, H.S. Hancock, in January, 1959, revised his first list to form list 2, as attached, in his second report (page 8). It included 31 anomalies, 28 from the entire previous list with altered priorities and 3 additions. The three additions were 10/4, 10/10 and 20/8, these numbers are underlined in list 2. The reasons for these additions are given on pages 3 (section g), 5 and 6 respectively, of this second report.

C. At the beginning of February, J.B. Boniwell re-evaluated list 2 of Hancock and produced list 3 of 20 anomalies, as presented in my memorandum of 17th February. This list of 20 included 16 from list 2 (20/5 as two and 24/1 as two), and four additions (14/6S, 17/9, 21/10S and 24/5C).

2. Ground Follow-Up

This campaign is summarised in the accompanying report by J.B. Boniwell.

Three of these anomalies (21/10S, 21/12, and 24/5C) are in the Precambrian, 21/12 was investigated as the best of these and on the basis of the lack of mineralisation at this location, and the general unfavourability of the Precambrian, 21/10S and 24/5C were dropped from this list. The remaining three (14/5, 14/6S and 17/9) were accorded a low priority and were not completed by the end of the field season. Anomaly 14/5 resembles that of 10/4 (and anomalies A6/1 and A6/2 in the Arthur area) and the negative results of these investigations can be applied to 14/5. On the overall results of the programme, anomalies 14/6S and 17/9 can also be excluded.

II. Geological Anomalies

At the beginning of the field season, five geological anomalies were established as follows:

A. Anomaly 6/3 (Pelias Cove)

This is the mineralisation noted at Pelias Cove on Macquarie Harbour.

It is readily accessible by water transport and as it was not checked during the summer, it is hoped to evaluate it before 1st November.

B. Anomaly 20/9

This anomaly is 2 to 3 miles south of Moore's Valley, on the Lyell Shear at the intersection of a N.W. trending structure. This investigation was not completed by the end of the season and is a project for the forthcoming summer.

C. Anomaly 20/10

This anomaly is 4 to 5 miles south of Moore's Valley in a similar structural setting as 20/9. The investigation (geological mapping and soil sampling) was negative.

D, Anomaly 24/8 (Lewis River)

This area covered known mineralisation north of the Lewis River. Geological mapping and soil sampling indicates that the area is not of economic interest.

E. Moore's Valley

This area will continue to be tested during the next season.

Chief Geologist, L.E.E.

TABLE I

Assessment List of Airborne Anomalies

List 1, (H.S. Hancock, November, 1958)

First Order Priority:	20/6
Second Order Priority:	14/5, 20/2, 20/4
Third Order Priority:	5/1, 6/2, 9/4, 10/1, 10/3b, 10/8, 17/2a, 18/6, 20/5, 24/1
Fourth Order Priority:	5/2, 10/2, 10/3a, 10/4a, 10/5, 10/6, 10/7, 17/6a, 18/1, 18/3, 18/11a, 20/1, 21/12, 23/2.

List 2 (H.S. Hancock, January, 1959)

First Order Priority:	20/6
Second Order Priority:	10/3b, 10/4a, 20/2, 20/4, 20/5
Third Order Priority:	5/1, 6/2, 9/4, 10/1, 10/8, 10/10, 14/5, 17/2a, 18/6, 24/1
Fourth Order Priority:	5/2, 10/2, 10/3a, 10/4, 10/5, 10/6, 10/7, 17/6a, 18/1, 18/3, 18/11a, 20/1, 20/8, 21/12, 23/2

Underlined anomalies are those which do not appear in the first list.

Underlined anomalies are those which do not appear in List 3.

List 3 (Boniwell-Hancock, February, 1959)

9/4, 10/1, 10/3b, 10/4, 10/4a, 10/8, 14/5, 14/6S, 17/9, 20/4, 20/5N, 20/5S, 20/6, 20/8, 21/10S, 21/12, 23/2, 24/1N, 24/1S, 24/5C.

Underlined anomalies are those which have been checked on the ground.

LYELL - E.Z. - EXPLORATIONS

23rd April, 1959

THE AIR-BORNE PROGRAMME

Gordon Area, Tasmania

Introduction

As a result of flying the airborne em. (Ronka system) and total intensity magnetometer by the Canso over a 1075 square mile tract south of Macquarie Harbour, a fairly large list of anomalies in a loose priority had been compiled for ground checking. Up to 2nd February, three anomalies had been partially investigated (20/6, 20/5 N & S) and three were in preparation (10/3b, 10/4a, 20/4). Of the three electrically checked, one had been found a and two had not.

It was felt that some re-evaluation at this stage would be of value in framing a ground programme that by season's end would provide an optimum and realistic cross-section of the air-survey data. Accordingly, the latter were re-assessed in toto, and a condensed and more potent anomaly list was drawn up. This was accepted on 16th February as the target programme for following-up operations in what was left of the season.

Due to several mitigating factors, the target number of twenty anomalies was not met, but a sufficient number (15) which by reason of priorities included those that patently held the best prospects were geophysically processed to maintain realism in the representation.

Results of the ground work are tabulated over:

Anomaly	Reason for Selection: Photo-geological Environment	Order of AEM Response	Ground Confirmed	Correlations: Grav. (mgals)	Magn. (gammas)	Geo-Chem.	Interest
9/4	Precambrian	Fair	Yes	Nil	Nil	Nil	Nil
10/1	Dundas on cross-structure near contact with Precambrian	Good	Yes	Nil	Nil	?	Nil
10/3b	Dundas near contact with Precambrian - assoc. with ultrabasic	Fair with magn. corrn.	Yes	0.1 (odd lines)	2300 peak	Chromite nearby nickel	Minor
10/4a	Dundas near ultra-basic contact	Fair, with magn. corrn.	Yes	Nil	Nil	?	Nil
10/4	In ultrabasics within Dundas	Poor, good to N., magn. corrn.	Yes	Nil	Incid-ental	?	Nil
10/8	Precambrian near contact with Dundas - with cross-strike?	Fair, with magn. corrn.	Yes?	Prob.	10700	Nil	Minor
20/4	Dundas	Poor	No	N.A.	N.A.	N.A.	Nil
20/5S 20/5N	Owen, near Lyell Shear	Poor	No No	N.A.	N.A.	N.A.	Nil
20/6	Dundas	Good	Yes	Nil	Nil	?	Nil
20/8	Dundas, near Lyell Shear	Poor	No	N.A.	N.A.	N.A.	Nil
21/12	Precambrian	Good, with magn. corrn.	No?	Nil	Nil	?	Nil
23/2	Owen, near Lyell Shear	Good	Yes	Nil	Nil	Nil	Minor
24/1N	Precambrian, near contact with granite	Good	Yes	Nil	70 (one line)	Nil	Nil
24/1S	Granite near contact with Precambrian	Good	No	N.A.	N.A.	N.A.	Nil

The Ground Approach

The actual ground attack was spear-headed by the dual frequency vertical loop unit which provided both a reconnaissance and detailed coverage of an area about the presumed position of the cause of the airborne response. Such was the coverage that all predictable errors in positioning arising from response lags and from air-record to ground transferences were encompassed. That is to say, if the air-response were a true expression of a bedrock conductor, this coverage would confirm it. Exceptional errors are rare, but the programme has provided one such case, viz. 24/1S (see anomaly report).

Auxiliary gravimetric and magnetic (vertical variometer) profiling of the grid area, and latterly geologic, was a routine, but vital measure to facilitate discrimination of the causes of conduction.

Ground Recovery and Implications

Fifteen A.E.M. anomalies were thus investigated with only minor variations. Of these, 9 were confirmed on the ground, a recovery of 60.0%. However, if it is considered that three, 20/4, 20/5 N & S, 20/8, would never normally be considered for ground follow-up, that is, their very lack of authenticity would preclude them, a recovery of 81.8% would have been attained, versus the world figure of 80-85%.

Thus, it could be claimed that the entire airborne operation has been technically sound. However, the economic implications are quite discouraging. Only three anomaly areas exhibited minor interest, and this by virtue of geology and geochemistry rather than by geophysics. The mineralisation at 10/3b and 23/2 can be largely discounted as non-significant occurrences, that is, like incidences can be expected throughout like settings completely divorced from airborne or ground em. The hematite-magnetite occurrence at 10/8 is more unique, but here there is considerable doubt that it was, in fact, detected electrically by the aircraft.unit (see anomaly report).

Qualitative Interpretation of Airborne Data

Again in this programme, it has been observed that no truly qualitativé interpretation of A.E.M. responses is possible. For e xample:

1. A.E.M. anomaly 9/4, of large magnitude and fair order, was shown to be an integration of several conducting horizons (themselves of no great strength)acutely angled to the flight path.
2. A.E.M. anomaly 10/1 is a good order response indicative of better-than-average conductivities, yet the ground work defined a wide zone of conduction quite clearly in the low conductivity range.
3. A.E.M. anomaly 10/4, at the point of the ground check, is only a very fair response, yet was successfully identified with a very strong, highly conducting shear zone.
4. A.E.M. anomaly 21/12, apparently of size and strength, was never really located on the ground.

These examples underline the fact that air-responses are affected by a large number of unpredictably variable parameters. Much the same condition holds for aeromagnetic expressions. The point is stressed to clearly demonstrate the need for geologic control in any future assessment of airborne data, and, therefore, the more such control the better.

Conclusions

Although it has been shown that the airborne survey was successful in detecting genuine bedrock conductors (along with spurious effects induced by idiosyncrasies of equipment and its flight in space, including overburden responses), it has become apparent that it has not detected sulphides where they could be best expected. The hard conclusion is that, on the laws of statistical chance, there are present in the area no sulphides amenable to aerial detection, at least by methods presently known. This excludes all the Tertiary covered areas, and therefore, much of the Lyell Shear.

It is implicit to such a conclusion that further follow-up work on the scale of this season would be a highly unrealistic operation. Should it ever become desirable, for reasons not presently apparent, to continue an investigation of the airborne indications, then the operation should essentially be a geological and geochemical reconnaissance, with the use of geophysics strictly reserved to one function: as a necessary adjunct to the successful probing of a highly probable setting mapped in the primary phase.

J.B. BONIWELL